

WHAT IS CLAIMED IS:

1. A punching device comprising:
- a die member having a plurality of die holes formed therein;
- 5 a plurality of punch members which are caused to advance into the die holes to punch holes in a member to be punched;
- an operating member having cam portions formed along a direction intersecting the direction of advancement of said punch members, said operating member being moved along the direction intersecting the direction of advancement of said punch members to cause by a conversion function of said cam portions said punch members to advance into the die holes; and
- 10 drive means for selectively causing advancement of said plurality of punch members by changing the direction of movement of said operating member.
- 15
2. A punching device according to claim 1,
- 20 wherein each of said cam portions has a straight groove and a cam groove for performing the conversion function, and wherein, when said operating member is moved in one of opposite directions, at least one of said cam grooves of said cam portions acts on one of
- 25 said punch members to selectively cause the same to advance.

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3. A punching device according to claim 2,
wherein one of said cam portions has two cam grooves
at its center, and straight grooves formed at
opposite ends of each cam groove, and is used to
5 control two of said punch members.

4. A punching device according to claim 2,
wherein one of said cam portions has one cam groove
at its center, and straight grooves formed at
10 opposite ends of the cam groove, and is used to
control two of said punch members.

5. A punching device according to claim 2,
wherein one of said cam portions has one cam groove
15 at its end, and a straight groove formed at an end of
the cam groove, and is used to control one of said
punch members.

6. A punching device according to claim 2,
20 wherein:

one of said cam portions has two cam grooves at
its center, and straight grooves formed at opposite
ends of each cam groove, and is used to control two
of said punch members;

25 another of said cam portions has one cam groove
at its center, and straight grooves formed at
opposite ends of the cam groove, and is used to

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control two of said punch members; and

a remaining one of said cam portions has one cam groove at its end, and a straight groove formed at an end of the cam groove, and is used to control one of
5 said punch members, two of said punch members and three of said punch members being selectively caused to advance.

7. A punching device according to claim 1,
10 wherein:

the cam portions of said operating member are sectioned in the order of a first rest area, a first punching area, a second punching area, a second rest area, a third punching area, a fourth punching area,
15 and a third rest area;

said operating member can be moved between the first rest area and the second rest area on the basis of a detection operation performed by means for detecting the position of said operating member under
20 the control of operation control means for controlling said drive means; and

said operating member performs in the first punching area a punching operation for causing at least one of said punch members to advance into the
25 corresponding die hole when moved from the first rest area to the second rest area, and performs in the second punching area a punching operation for causing

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said at least one of the punch members to advance into the corresponding die hole when moved from the second rest area to the first rest area.

5 8. A punching device according to claim 7,
wherein said operation control means performs an
initializing operation for moving said operating
member to the second rest area when said operating
member is located in the first rest area or in the
10 first punching area, and that for moving said
operating member to the first rest area when said
operating member is located in the second rest area
or in the second punching area.

15 9. A punching device according to claim 1,
wherein:

the cam portions of said operating member are
sectioned in the order of a first rest area, a first
punching area, a second punching area, a second rest
20 area, a third punching area, a fourth punching area,
and a third rest area;

said operating member is moved on the basis of a
detection operation performed by means for detecting
the position of said operating member under the
25 control of operation control means for controlling
said drive means;

said operating member punches a first number of

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holes in the member to be punched with the
corresponding number of said punch members when said
operating member performs in the first punching area
a punching operation for causing the corresponding
5 number of said punch members to advance into the
corresponding die holes during its movement from the
first rest area to the second rest area, and when
said operating member performs in the second punching
area a punching operation for causing the
10 corresponding number of said punch members to advance
into the corresponding die holes during its movement
from the second rest area to the first rest area; and
said operating member punches a second number of
holes in the member to be punched with the
15 corresponding number of said punch members when said
operating member performs in the third punching area
a punching operation for causing the corresponding
number of said punch members to advance into the
corresponding die holes during its movement from the
20 second rest area to the third rest area, and when
said operating member performs in the fourth punching
area a punching operation for causing the
corresponding number of said punch members to advance
into the corresponding die holes during its movement
25 from the third rest area to the second rest area.

10. A punching device according to claim 9,

wherein said operation control means performs, on the basis of the detection operation of said position detection means, an initializing operation for moving said operating member to the second rest area when
5 said operating member is located in the first rest area or in the first punching area, that for moving said operating member to the first rest area when said operating member is located in the second rest area or in the second punching area, that for moving
10 said operating member to the third rest area when said operating member is located in the second rest area or in the third punching area, and that for moving said operating member to the second rest area when said operating member is located in the third
15 rest area or in the fourth punching area.

11. A punching device according to claim 10, wherein a speed of the movement of said operating member in the initializing operation is lower than
20 that in the punching operation.

12. A punching device according to claim 10, wherein said operation control means stops the operation of said drive means if said position
25 detection means does not detect the movement of said operating member after a lapse of a predetermined period of time from the time at which said operation

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control means starts the operation of said operating member.

13. A punching device according to claim 12,
5 wherein the predetermined period of time in the case of the initializing operation is longer than that in the case of the punching operation.

14. A sheet processor comprising a punching
10 device for punching holes in the sheet according to any one of claims 1 to 13.

15. An image forming apparatus comprising:
image forming means for forming an image on a
15 sheet; and

a punching device for punching holes in the sheet according to any one of claims 1 to 13.

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